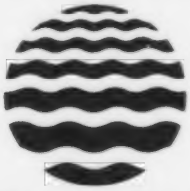
STOPPING WATER POLLUTION AT ITS SOURCE



MISA

Municipal/Industrial Strategy for Abatement

THE EFFLUENT MONITORING PRIORITY POLLUTANTS LIST

1988 UPDATE

Environment Ontario

Jim Bradley
Minister

ISBN: 0-7729-5450-X

89-05705/

THE EFFLUENT MONITORING PRIORITY POLLUTANTS LIST 1988 UPDATE

Hazardous Contaminants Coordination Branch

March 1989
Reprinted May 1989

Copyright: Queen's Printer for Ontario, 1989

Executive Summary

This update identifies 87 chemicals for promotion to the Ontario Effluent Monitoring Priority Pollutants List (EMPPL). These were selected from a total of 160 chemicals assessed for this update, and their promotion brings the total number of chemicals on the EMPPL to 266. These chemicals would pose a potential hazard if released to the receiving environment.

The hazard assessments were performed using a modified version of the MOE assessment process developed for the 1987 EMPPL. A set of guidelines clarifying the use of the scoring criteria and the application of score qualifiers is included in an appendix.

In November 1988, a draft of this document was circulated for comment through the Priority Substances Advisory Committee, the MOE/Industrial Sector/Municipal Sector Joint Technical Committees and the MISA Advisory Committee. The draft document was amended accordingly, where appropriate.

Table of Contents

1 Introduction 1

2 Procedure for Listing Chemicals on the 1988 EMPPL Update 1
2.1 Chemical Identification 1
2.2 Preliminary Hazard Assessment Process 1
2.2.1 Information Base and Search Strategy for Preliminary Assessments ... 3
2.2.2 EMPPL Scoring Criteria 4
2.3 Review and Approval of Assessments 4

3 The EMPPL Delisting Procedure 4

4 Effluent Monitoring Priority Pollutants List Update - 1988 7

5 Bibliography 21

Appendix A: Guidelines for Using EMPPL Score Qualifiers and Criteria A-1

Appendix B: Information Sources for Preliminary Assessments B-1

Appendix C: Priority Substances Advisory Committee C-1

Appendix D: Chemicals Not Promoted to the EMPPL D-1

1 Introduction

In July 1988 the Ontario Ministry of the Environment released a report entitled "The Effluent Monitoring Priority Pollutants List (1987)". This report described a chemical hazard assessment methodology for the ongoing development of the Effluent Monitoring Priority Pollutants List (EMPPL). The EMPPL hazard assessment process is based on a chemical's environmental persistence, potential to bioaccumulate, acute and sublethal toxicity to biota (including humans), and potential to exist in effluents discharged to surface waters.

The 1987 EMPPL consists of 179 chemicals or chemical groups posing a hazard to the environment and detected, or suspected of being present, in Ontario municipal and industrial effluents. The EMPPL provides a sound basis for the development of chemical-specific monitoring regulations under the MISA programme.

This 1988 EMPPL Update document is the first of a series of updates and includes 87 chemicals for addition to the EMPPL. Assessment summaries will be released in annual EMPPL reports.

Complete information and documentation for each chemical assessment is available for examination at the Hazardous Contaminants Coordination Branch, 7th floor, 40 St. Clair Avenue West, Toronto, (416) 323-5095.

2 Procedure for Listing Chemicals on the 1988 EMPPL Update

The EMPPL is a dynamic list, undergoing periodic revision. The current assessment process is a refinement of the process used to develop the 1987 EMPPL (ref. 79). The two-stage assessment process consists of a chemical identification stage and a preliminary hazard assessment stage (Figure 1). The assessment process has been approved by the Ministry's Priority Substances Advisory Committee (PSAC). Please refer to Appendix C for the terms of reference and membership of PSAC.

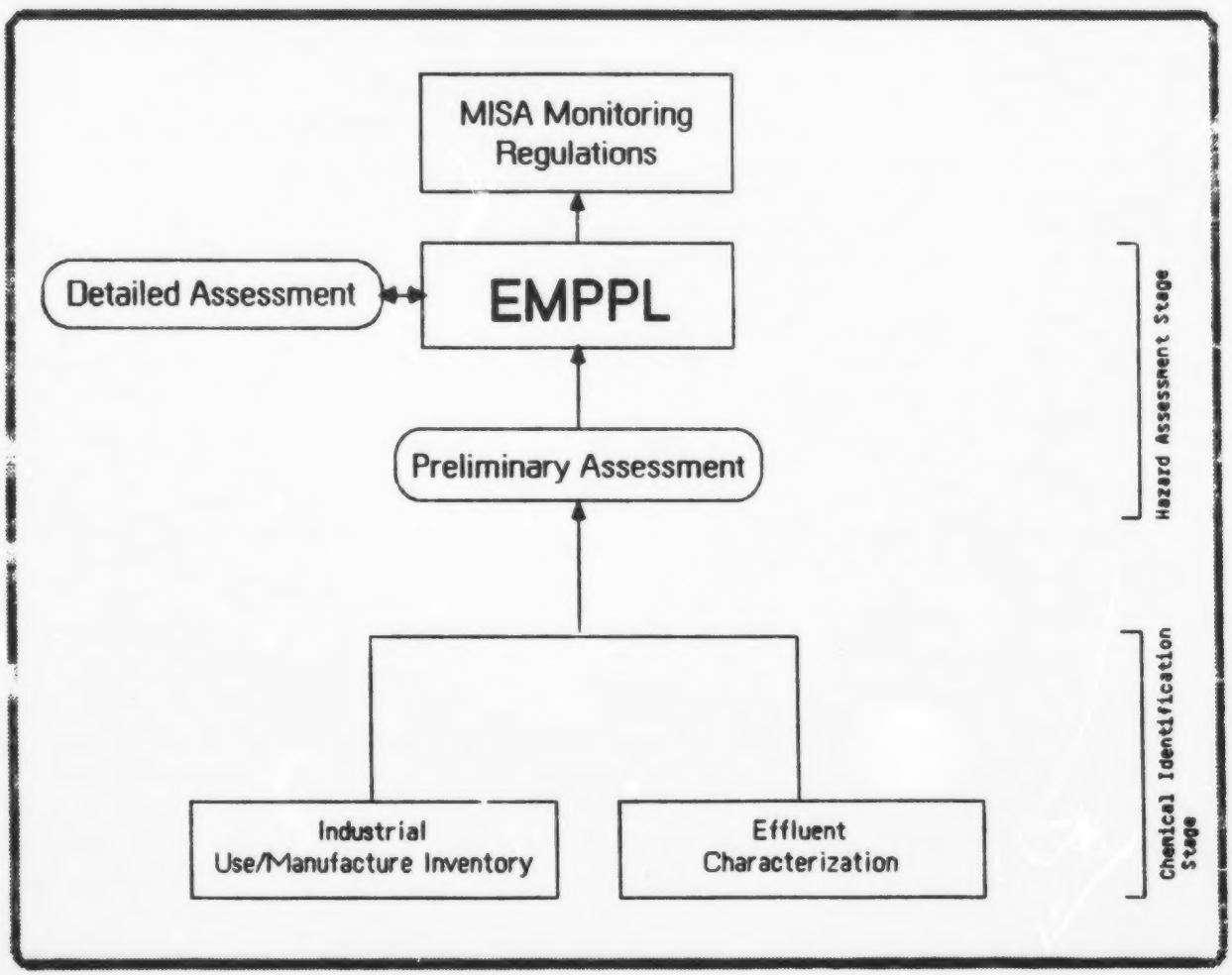
2.1 Chemical Identification

The first step in the assessment process was the development of a comprehensive list of candidate chemicals. For the 1987 EMPPL, this list consisted of a primary group (chemicals detected in effluents or surface water) and a secondary group (chemicals not yet detected but which would be of concern if found to be present in Ontario effluents). For the 1988 EMPPL Update, chemicals identified to date by the MISA office from the Organic Chemical, Iron & Steel, Mining, Electric Power Generation and Pulp & Paper Sectors were considered for preliminary assessments.

2.2 Preliminary Hazard Assessment Process

The hazard assessment process used for developing the 1987 EMPPL was derived from the MOE scoring system and from hazard classification systems used by the Michigan Department of Natural Resources and the Niagara River Toxics Committee. For the 1988 EMPPL Update, the MOE scoring system was used exclusively. Guidelines for using the scoring criteria and score qualifiers have been clarified and formalized as described in Appendix A.

FIGURE 1
PROCESS USED TO DEVELOP THE 1988 UPDATE OF
THE EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL)



The preliminary assessments were largely based on data readily obtainable from secondary sources. Preliminary assessments were performed by consultants under contract to the Ministry. Primary group chemicals were assessed according to the nine effects parameters specified in the EMPPL document, using data obtained through the search strategy described in section 2.2.1 below. Scores were assigned according to a worst-case convention, such that the scores for each effects parameter were based on the data indicating the highest levels of concern.

2.2.1 Information Base and Search Strategy for Preliminary Assessments

The information bases and search strategy used for obtaining data for conducting preliminary assessments are described below in separate sections. The search strategy is divided into two levels, Levels I and II, each utilizing both printed and computer-accessed sources of information. The objective of the search strategy is to collect, for every chemical, sufficient information to permit scoring according to each adverse effects parameter specified. Both search levels may not be required for every chemical; enough data may be collected for a given chemical after a Level I search to permit assessment. The Level II search is intended to address specific areas where information is scarce after a Level I search, so only certain sources listed under Level II may be consulted. Data deficiencies remaining after a Level II search are documented.

A. Level I Search

The Level I search includes, but is not necessarily limited to, the reference texts and factual databases given in Appendix B.

B. Level II Search

The Level II search utilizes computer-accessed, bibliographic databases to locate primary literature on chemicals for specific parameters (i.e., those for which little or no data is obtained after a Level I search). In addition, the QSAR database, which uses structure-activity relationships to estimate physicochemical, biodegradation and toxic properties, is used if required. The databases which may be searched in Level II, depending on information requirements, are also given in Appendix B.

The computer-accessed database searches are primarily conducted using the Chemical Abstracts Service (CAS) registry number as the chemical identification key. The searches are limited to specific keywords or subject codes according to the information deficiencies to be addressed. The databases are searched to cover all years contained in their files.

When many references are found for a particular chemical during the Level II search, the following procedures are employed: the titles retrieved may be printed out and full abstracts requested for those papers which appear to be relevant; the search may be truncated by using additional keywords or selecting only the most recent references; or information retrieval may be restricted to review papers only.

2.2.2 EMPPL Scoring Criteria

A. Effects and Environmental Fate Assessment

Table 1 summarizes the hazard assessment criteria used for creating the 1987 EMPPL and the 1988 EMPPL Update. This table is to be used in conjunction with the full criteria descriptions given in the 1987 EMPPL document (ref. 79) appendix, "Ontario Ministry of the Environment Screen III Parameters", and with the guidelines given in Appendix A.

The use of score qualifiers (or "tags") to indicate concerns about the nature of data used for assigning a score was described briefly in the 1987 EMPPL report (ref. 79) appendix referred to above. In the course of performing preliminary assessments, these tags have been frequently applied. To ensure consistency in the application of tags, specific guidelines for their use are given in the Appendix A. In addition, descriptions of the types of data acceptable or preferred for several scoring parameters are provided.

B. Exposure Assessment

The exposure assessment criteria used for the 1987 EMPPL were amended for the 1988 EMPPL Update (Table 2). All chemicals assessed for the 1988 Update were classified as "B", i.e. detected in effluent or reported as being discharged, confirmed Ontario use/manufacture and probable presence in process aqueous discharges, or detected in the natural environment with probable use and/or manufacture in Ontario.

C. Promotion to the EMPPL

A chemical is promoted to the EMPPL if its exposure classification is "A" or "B" and any one of a number of parameter scores equal or exceed a specified value, known as a "concern level". The concern levels are given in Table 3. Meeting or exceeding the concern level for persistence alone does not cause promotion to the EMPPL, however the persistence score may support promotion based on other parameters.

2.3 Review and Approval of Assessments

The preliminary assessments produced by the contractor were reviewed by MOE Hazardous Contaminants Coordination Branch staff and amended and/or discussed with the contractors where necessary. Also, specific assessments were referred to PSAC for review when difficulties in interpretation of data or data quality arose.

The contractor's senior toxicologist gave final approval to the preliminary assessment results.

3 The EMPPL Delisting Procedure

The EMPPL delisting procedure is illustrated in Figure 2. The Hazardous Contaminants Coordination Branch (HCCB) compiles the relevant adverse effects scores and exposure information generated by preliminary assessments (as in Tables 4 and 5). This information is provided to PSAC, the Joint Technical Committee (JTC) for each sector through the MISA Sector Specialists, and to the MISA Advisory Committee for review.

Table 1
EMPPL Effects Assessment Criteria

Bold borders indicate concern levels
See Appendix A for use of score qualifiers

PARAMETER	UNITS	0	4	7	10
Environmental Transport*	Percent partitioning, measured or predicted	Any single medium contains >95% of the total amount released	Any single medium contains >90-95% of the total amount released	Any single medium contains >80-90% of the total amount released	No single medium contains >80% of the total amount released
Environmental Persistence	$t_{1/2}$ (days)	≤10	>10 to 50	>50 to 100	>100
Bio-accumulation	BCF Log k_{ow}	≤20 ≤2.0	>20 to 500 >2.0 to 4.0	>500 to 5000 >4.0 to 6.0	>15000 >6.0

PARAMETER	UNITS	0	2	4	6	8	10
Acute Lethality	oral LD_{50} mg/kg	>5000	>500-5000	>50-500	>5-50	>0.5-5	≤0.5
	dermal LD_{50} mg/kg	>5000	>500-5000	>50-500	>5-50	>0.5-5	≤0.5
	inhal. LC_{50} mg/m^3	>15000	>1500-15000	>150-1500	>15-150	>1.5-15	≤1.5
	aquatic LC_{50} mg/L	>1000	>100-1000	>10-100	>1-10	>0.1-1	≤0.1
Sublethal Effects, Non-Mammals	aquatic EC_{50}, mg/L MATC, mg/L NOAEC,mg/L	 ≥20 ≥2 ≥0.2	 2-<20 0.2-<2 0.02-<0.2	 0.2-<2 0.02-<0.2 0.002-<0.02	 0.02-<0.2 0.002-<0.02 0.0002-<0.002	 <0.02* <0.002* <0.0002*	 <0.02* <0.002* <0.0002*
	terrestrial subchronic NOEL mg/kg chronic NOEL mg/kg	 ≥1000 ≥500	 100-<1000 50-<500	 10-<100 5-<50	 1-<10 0.5-<5	 <1* <0.5* *in one genus	 <1* <0.5* *in different genera
Sublethal Effects, Plants	aquatic EC_{50} mg/L NOAEC mg/L	 >100 >10	 >10-100 >1-10	 >1-10 >0.1-1	 >0.1-1 >0.01-0.1	 0.01-0.1 0.001-0.01	 <0.01 <0.001
	terrestrial EC_{50} mg/L water ug/m^3 air mg/kg soil NOAEC mg/L water ug/m^3 air mg/kg soil	 >100 >100000 >1000 >10 >10000 >100	 >10-100 >10000-100000 >100-1000 >1-10 >1000-10000 >10-100	 >1-10 >1000-10000 >10-100 >0.1-1 >100-1000 >1-10	 >0.1-1 >100-1000 >1-10 >0.01-0.1 >10-100 >0.1-1	 0.01-0.1 10-100 0.1-1 0.001-0.01 1-10 0.01-0.1	 <0.01 <10 <0.1 <0.001 <1 <0.01
Sublethal Effects, Mammals	oral NOEL mg/kg inhal. NOEL mg/m^3	>1000 >3000	>100-1000 >300-3000	>10-100 >30-300	>1-10 >3-30	>0.1-1 >0.3-3	≤0.1 ≤0.3
Teratogenicity	narrative mg/kg/day	no terata, or terata only at >1000	terata or developmental anomalies at >50-1000	terata or developmental anomalies at >10-50	terata or developmental anomalies at >1-10	terata at >0.1-1, without overt maternal toxicity	terata at ≤0.1 without overt maternal toxicity
Genotoxicity /Mutagenicity	narrative	no evidence of genotoxicity or mutagenicity with adequate testing	positive results in vitro only	genotoxic /mutagenic in prokaryotic systems only	effects on DNA, but no direct interactions with DNA	clastogenic effects but no direct interactions with DNA	genotoxic /mutagenic, usually with direct interactions with DNA
Carcinogenicity	narrative; human and animal bioassay data	no tumours in adequate studies on at least two species, and does not interact with genetic material	tumours in only one animal species, negative results in others	causes benign tumours in more than one species, and does not interact with genetic material; promotor only; or causes cell transformation in vitro only (negative evidence in vivo)	tumourigenic in bioassays at doses causing metabolic enzyme saturation, or associated with lesions that predispose to tumours. No interaction with genetic material	indirect-acting (epigenetic) carcinogen, no interaction with genetic material	direct-acting carcinogen that interacts with genetic material

* The Environmental Transport parameter is for information purposes only, and does not influence the promotion of a chemical to the EMPPL.

Table 2
EMPPL Exposure Assessment Criteria*

Classification	Criterion
A	almost always present, based on >50% detection and minimum of 5 data points
B	potentially present in Ontario, based on: detection in effluent or reported as being discharged; *confirmed Ontario use/manufacture and probable presence in a process aqueous discharge;* or detected in the natural environment and probable Ontario use/manufacture
C	Inferred to be present in a process aqueous discharge and probable Ontario use/manufacture
D	Possibly present, based on use/manufacturing information only
E	Not present, based on analytical data and/or inference from the literature

* - Amendment to 1987 EMPPL exposure assessment criteria is indicated by italic type

Table 3
Parameter Scores Leading to Promotion to the EMPPL
(Concern Levels)

Parameter	Promote if score Equals or Exceeds:
Persistence	7*
Bioaccumulation	7
Acute Lethality	6
Sublethal Toxicity, non-mammals	6
Sublethal Toxicity, plants	6
Sublethal Toxicity, mammals	6
Mutagenicity/Genotoxicity	6
Teratogenicity	2
Carcinogenicity	2

* - A persistence score of $\geq$7 alone does not cause promotion to the EMPPL, but may support promotion based on other parameters.

The HCCB and PSAC then reviews the JTCs' and the MAC's comments. Inappropriate scores resulting from oversights or from errors in transcription from data sources (denoted in Figure 2 as "primary" errors) are corrected immediately and the EMPPL is revised accordingly. If scores are challenged, e.g. with respect to quality of data, or due to differing opinions on the scoring or conflicting results from various studies, the chemical is scheduled for an exhaustive detailed review in which these aspects are addressed. Proponents are advised of the scheduling of the detailed assessments.

It is intended that every chemical on the EMPPL will be subjected to detailed assessment. These assessments are both time consuming and resource intensive. Should the date scheduled for a given detailed assessment be unsatisfactory, a proponent may opt to conduct a detailed assessment provided that the Ministry's procedure and format is adhered to. A procedure manual for conducting detailed assessments is available from the HCCB.

Detailed assessments will be reviewed by the HCCB and PSAC and any revisions to the EMPPL will be reflected in future updates.

4 Effluent Monitoring Priority Pollutants List Update - 1988

For the 1988 Update 160 chemicals were assessed, of which 87 were designated as being of sufficient concern to warrant monitoring. Table 4 provides the scores for those chemicals promoted to the EMPPL. Table 5 provides, for each chemical, the references on which the identification of the chemical was based, the sector in which the chemical was identified and an indication if a routine analytical protocol and minimum detection limit are currently available at the Ministry's laboratory for the chemical. In some cases, chemicals found in open scans have been only tentatively identified. Table 6 includes chemicals that would be promoted based solely on estimated aquatic toxicity as predicted by a quantitative structure-activity relationship (QSAR) model; these chemicals have been held from promotion pending verification of the reliability of the model. The scores for chemicals not promoted to the EMPPL are given in Appendix D.

FIGURE 2
EMPPL DELISTING PROCESS

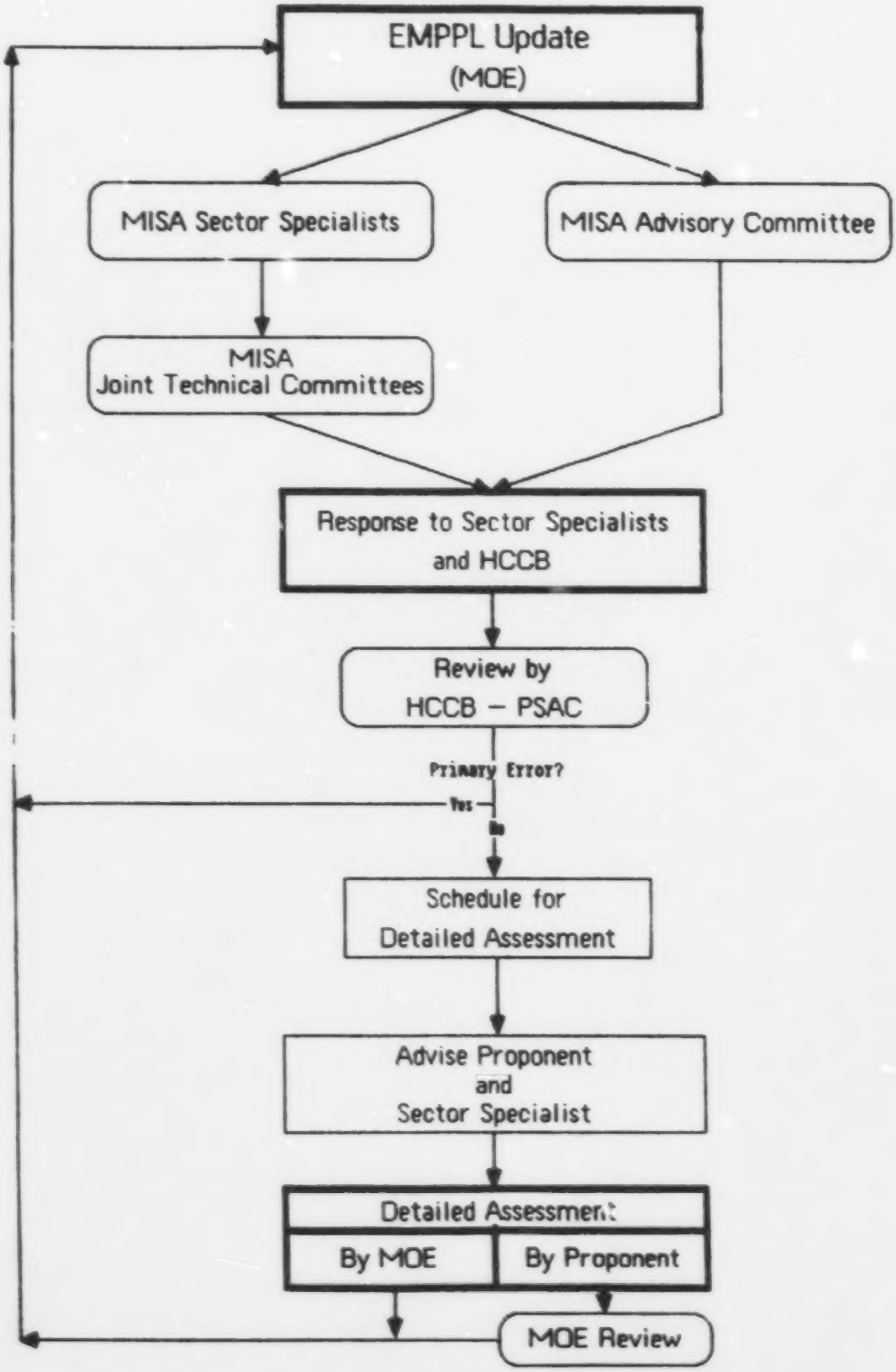


TABLE 4

1988 EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL) UPDATE

CHEMICALS PROMOTED TO THE EMPPL

KEY TO ABBREVIATIONS USED IN TABLE 4
AQUATIC: aquatic biota
BIOAC: bioaccumulation
CARCIN: carcinogenicity
DERMAL: terrestrial biota, dermal exposure route
ENVIRON FATE: environmental fate
GEN-MUT: genotoxicity/mutagenicity
INHAL: terrestrial biota, inhalational exposure route
NON-MAM: non-mammalian species
ORAL: terrestrial biota, oral exposure route
PERSIST: environmental persistence
SUMMARY: final score assigned to parameter
TERAT: teratogenicity
TERREST: terrestrial species
TRANS: environmental transport (partitioning)

TABLE 4

1988 EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL) UPDATE :

CHEMICALS PROMOTED TO THE EMPPL

Date: 08/03/89

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	ASSESSMENT DATE	TOXICITY: Environ-Fate: TRANS	PERSIST	BIOACCUM	TOXICITY: Acute: SUBQUAL MAMMAL	ACUTE AQUATIC	ACUTE ORAL	ACUTE INHALATION	ACUTE DERMAL	TOXICITY: Sub-lethal: Non-Mam: SUBQUAL MAMMAL	CHRONIC AQUATIC	TERATOGENIC	Plant: SUBQUAL MAMMAL	CHRONIC AQUATIC	TERATOGENIC	Mammalian: SUBQUAL MAMMAL	OTHER	INHALATION	TERATOGENIC	GENETIC - MUTAGENIC	CARCINOGENIC
acrylamide	79-06-1	20/06/88	0E	4L	0E	4	2	4		4	0	0	*	2Q	*	2Q	8	8	*	0L	10	10
1H-benzimidazole	51-17-2	30/07/88	*	4E	0L	4E	4E	2	*	*	0	0	*	*	*	*	*	*	*	2Q	8L	0Q
benzo[b]thiophene	95-15-8	20/06/88	7E	4E	7E	10Q	10Q	2	*	*	2W	2W	*	*	*	*	6Q	6Q	*	*	*	*
benzo[h]quinoline	230-27-3	30/07/88	*	*	4L	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	8Q	*
benz[a]acridine	225-11-6	20/06/88	*	*	4	8L	8L	*	*	*	4Q	4Q	*	*	*	*	*	*	*	*	*	0L
borneol	507-70-0	20/06/88	10E	7W	4E	4	4E	4	*	*	0E	0E	*	*	*	*	4Q	4Q	*	*	8L	*
boron	7440-42-8	30/05/88	10E	10E	0Q	4L		4L	*	*	*	*	*	4	*	4	6Q	4	6Q	8L	*	0L
1-bromo-2-chloroethane	107-04-0	30/05/88	10E	4E	0E	4	2E	4	*	*	0E	0E	*	*	*	*	*	*	*	*	10	*
bromodichloromethane	75-27-4	30/05/88	7E	10L	4	4	2E	4	*	*	0E	0E	*	*	*	*	*	*	*	*	10	10
p-bromophenol	106-41-2	31/08/88	0E	10E	4	4	4	2	*	*	2L	2L	*	2	2	*	*	*	*	*	*	4Q
2-butenoic acid	3724-65-0	30/05/88	0E	4E	0L	4	2E	4	*	4	0E	0E	*	*	*	*	*	*	*	*	6Q	*
2-(2-butoxyethoxy)ethanol	112-34-5	20/06/88	0E	4E	0L	2	0	2	*	2	0E	0E	*	0L	0L	*	6Q	6Q	*	0	0	*
N-t-butyl-2-benzothiazolesulphenamide	95-31-8	30/07/88	*	4E	*	4W	*	4W	*	*	*	*	*	*	*	*	*	*	*	*	10L	*
n-butylamine	109-73-9	30/07/88	10E	0	0L	4	4	4	4	4	0E	0E	*	6Q	6Q	*	*	*	*	*	8L	2Q
9H-carbazole	86-74-8	30/07/88	10E	0Q	4	4W	4E	4W	*	*	2L	2L	*	*	*	*	*	*	*	*	0L	4Q
carbon disulfide	75-15-0	30/05/88	0E	0L	0E	4	4	4	2	*	*	*	*	*	*	*	*	*	*	6	10	0Q
cineole	470-82-6	20/06/88	7E	7Q	0E	2	2E	2			0E	0E	*	*	*	*	*	*	*	0L	8L	*
cyclohexanol	108-93-0	30/05/88	0E	4L	0L	4Q	4Q	2	*	0	0E	0E	*	*	*	*	*	*	*	*	8	*
cyclohexanone	108-94-1	30/05/88	4E	0L	0L	4Q	4Q	2	0	2	0E	0E	*	0	0	*	*	*	*	0	10W	0L
N-cyclohexyl-2-benzothiazolesulphenamide	95-33-0	30/07/88	*	7Q	*	6W	*	6W	*	*	*	*	*	*	*	*	*	*	*	0	0L	2Q
cyclohexylamine	108-91-8	31/08/88	10E	4E	*	4	4	4	4	4	0L	0L	*	8Q	8Q	*	4	4	*	0	10	2Q
di-n-octyl phthalate	117-84-0	15/12/88	10E	0	7	2	*		0	2	0	0	*	*	*	*	4Q	4Q	0Q	0Q	0L	*
4,4'-di-n-octyldiphenylamine	101-67-7	31/08/88	10E	4E	10E	10E	10E	0	*	*	6E	6E	*	0	0	*	*	*	*	*	6Q	*
1,4-dichlorobut-2-ene	764-41-0	31/08/88	10E	4E	4E	4	*	4	4	2	0	0	*	*	*	*	*	*	*	0L	10W	10Q
1,2-dichlorobut-3-ene	760-23-6	31/08/88	7E	4E	4E	6	6	2	2	*	2	2	*	*	*	*	4W	4W	*	*	10	*

TABLE 4

1988 EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL) UPDATE :

CHEMICALS PROMOTED TO THE EMPPL

Date: 06/03/89

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	ASSESSMENT DATE	TOXICITY: Environ-Fate: TRANSPORT	TOXICITY: Environ-Fate: PERSISTENCE	TOXICITY: Environ-Fate: BIOACCUMULATION	TOXICITY: Acute: SUMMARY	TOXICITY: Acute: AQUATIC	TOXICITY: Acute: ORAL	TOXICITY: Acute: INHALATION	TOXICITY: Acute: DERMAL	TOXICITY: Sub-lethal: Non-Mam: SUMMARY	TOXICITY: Sub-lethal: Non-Mam: AQUATIC	TOXICITY: Sub-lethal: Non-Mam: TERRESTRIAL	TOXICITY: Sub-lethal: Plant: SUMMARY	TOXICITY: Sub-lethal: Plant: AQUATIC	TOXICITY: Sub-lethal: Plant: TERRESTRIAL	TOXICITY: Sub-lethal: Mammalian: SUMMARY	TOXICITY: Sub-lethal: Mammalian: ORAL	TOXICITY: Sub-lethal: Mammalian: INHALATION	TOXICITY: Sub-lethal: Mammalian: TERATOGENIC	TOXICITY: Sub-lethal: Mammalian: GENETIC	TOXICITY: Sub-lethal: Mammalian: CARCINOGENIC
dichlorobutene (isomer nonspecific)	11069-19-5	31/08/88	10W	4W	4W	6W	6W	4W	4W	4W	2W	2W	*	*	*	*	4W	4W	*	6W	10W	10W
4,5-dichloroguaiacol	2460-49-3	20/06/88	*	*	4L	6	6	*	*	*	2	2	*	4L	4L	*	*	*	*	*	2L	*
diethyl phthalate (DEP)	84-66-2	31/08/88	0E	0	4	4	4	2	2		0L	0L		4L	4L		2Q	2Q		4	4Q	*
N,N-diethyl-m-toluamide (DEET)	134-62-3	30/07/88	4E	*	4E	2	2	2	2	2	0	0	0	*	*	*	4	4	0	4Q	8Q	*
1,3-diethylbenzene (meta)	141-93-5	31/08/88	4E	*	7E	6	6	0	*	*	2E	2E	*	*	*	*	*	*	*	*	*	*
1,2-diethylbenzene (ortho)	135-01-3	31/08/88	4E	*	7E	4	4	0	*	*	2E	2E	*	2	2	*	*	*	*	*	*	*
5,6-dihydro-2-methyl-1,4-oxathiin-3-carboxanilide	5234-68-4	30/07/88	7E	*	4L	6	6	4	0	2	*	*	*	4L	*	4L	2	2	*	0L	0L	*
5,6-dihydro-2-methyl-1,4-oxathiin-3-carboxanilide-4,4-dioxide	5259-88-1	30/07/88	*	*	*	6	6	2	*	0	*	*	*	4L	*	4L	4Q	4Q	*	*	2L	*
dimethyl sulphide	75-18-3	20/06/88	0E	*	0E	6Q		2	6Q		*	*	*	*	*	*	2L	2L	*	*	*	*
2,5-dimethylphenol	95-87-4	30/07/88	7E	0Q	4L	6	6	4	*	*	2L	2L	*	0	0	*	*	*	*	*	0L	4L
2,6-dimethylphenol	576-26-1	30/07/88	0E	0Q	4L	4	4	4	*	2	2	2	*	0	0	*	10	10	6Q	*	0L	2Q
3,4-dimethylphenol	95-65-8	30/07/88	*	0Q	4L	6	6	4	*	*	*	*	*	*	*	*	8L	8L	*	*	0L	4L
3,5-dimethylphenol	108-68-9	30/07/88	7E	0Q	4L	4	4	4	*	*	2L	2L	*	0	0	*	*	*	*	*	0L	4L
dimethylphenol (isomer nonspecific)	1300-71-6	30/07/88	7W	0W	4W	6W	6W	4W	*	2W	2W	2W	*	0W	0W	*	10W	10W	10W	*	6W	4W
diphenyl 4,4'-methylenedicarbanilate	101-65-5	30/07/88	4E	10E	10E	10E	10E	*	*	*	6Q	6Q	*	*	*	*	*	*	*	*	*	*
diphenylmethane 4,4'-diisocyanate (MDI)	101-68-8	30/07/88	0E	4E	0E	4	*	2Q	4	*	*	*	*	*	*	*	6	6Q	6		10Q	*
ethanol	64-17-5	31/08/88	10	0	0L	0	0	0	0	0	0	0	*	0Q	0Q	*	*	*	*	2W	10	10
ethylbenzene	100-41-4	30/05/88	0E	4	4	8W	8W	2	0	0	0	0	*	2	2	2	2	2	2	2	8L	0L
furfural	98-01-1	20/06/88	0E	4E	0L	6	6	6	4	0L	0	0	*	2L	2L	*	8Q	*	8Q	*	10	10L
guaiacol	90-05-1	20/06/88	0E	4E	4E	4	4	2	2	2	0	0	*	0L	*	0L	*	*	*	*	8	4Q
1,2,3,4,5,6-hexachlorocyclohexane (gamma isomer) (Lindane)	58-89-9	30/07/88	10E	10	7	10	10	6	*	6	8	8		*	*	*	10	6	10	4	10	10
hydrogen sulfide	7783-06-4	20/06/88	*	*	*	10	10		4		8	8	*	10L	*	10L	10	*	10	*	8L	*
2-hydroxy-3-methyl-2-cyclopenten-1-one	80-71-7	20/06/88	4E	4E	0E	2	0E	2	*	*	0E	0E	*	*	*	*	*	*	*	*	8L	*
lithium	7439-93-2	20/06/88	10E	10E	*	4	2	4			0Q	0Q	*	*	*	*	4	4	*	6	8L	*
2-mercaptobenzothiazole disulphide	120-78-5	30/07/88	*	10E	4E	4Q	*	4	*	*	*	*	*	*	*	*	*	*	*	4Q	2Q	2Q

TABLE 4

1988 EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL) UPDATE :

CHEMICALS PROMOTED TO THE EMPPL

Date: 06/03/89

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	ASSESSMENT DATE	-Environ- --Fate--- PERSISTANCE	BIOACCUMULATION	TOXICITY: Acute: SQUAMOUS	TOXICITY: Acute: AQUATIC	TOXICITY: Acute: ORAL	TOXICITY: Acute: INHALATION	TOXICITY: Acute: DERMAL	TOXICITY: Sub-lethal: Non-Mam: SQUAMOUS	TOXICITY: Sub-lethal: Non-Mam: AQUATIC	TOXICITY: Sub-lethal: Non-Mam: TERRESTRIAL	TOXICITY: Sub-lethal: Plant: SQUAMOUS	TOXICITY: Sub-lethal: Plant: AQUATIC	TOXICITY: Sub-lethal: Plant: TERRESTRIAL	TOXICITY: Mammalian: SQUAMOUS	TOXICITY: Mammalian: ORAL	TOXICITY: Mammalian: INHALATION	TOXICITY: Mammalian: TERATOGENIC	TOXICITY: GENETIC - MAMMALIAN - CHINESE HAMSTER	TOXICITY: GENETIC - MAMMALIAN - MOUSE
2-mercaptoethanol	60-24-2	30/07/88	0E	*	0E	4	0E	4	2	4	0E	0E	*	*	*	*	*	*	*	*	8	*
methyl methacrylate	80-62-6	30/05/88	10E	0	0	2	2	2	0	0	0E	0E	*	*	*	*	2Q	*	2Q	4W	8Q	0Q
2-methylpyridine	109-06-8	30/07/88	10E	0	0L	4	2	4	2Q	4	0	0	*	*	*	*	8Q	6Q	8Q	*	10	*
m-methylstyrene	100-80-1	30/07/88	7E	*	4E	6E	6E	*	*	*	0E	0E	*	*	*	*	*	*	*	*	8L	*
p-methylstyrene	622-97-9	30/07/88	4E	*	4E	6E	6E	*	*	*	0E	0E	*	*	*	*	*	*	*	*	8	*
morpholine	110-91-8	20/06/88	0E	7Q	0L	4	2	2	4	4	0	0	*	2L	2L	*	6Q	6Q	*	*	8	10L
N-morpholinyl-2-benzothiazolesulphenamide	102-77-2	31/08/88	*	*	*	2	*	2	*	*	*	*	*	*	*	*	*	*	*	2Q	10W	10L
1-naphthalenol	90-15-3	30/07/88	4E	0	4L	8	8	4	*	2	2W	2W	*	4	4	*	*	*	*	*	8	*
nitrobenzene	98-95-3	31/08/88	4E	0	0	4	4	2	*	2	0	0	*	2	2	*	8Q	4	8Q	2	2Q	*
2-nitrophenol	88-75-5	31/08/88	0E	4	0L	4Q	4	4Q	*	*	0L	0L	*	8	8	*	10Q	10Q	*	*	2W	*
4-nitrosomorpholine	59-89-2	31/08/88	0E	4	0E	4	*	4	4L	*	*	*	*	*	*	*	8Q	8Q	*	*	10	10
N-phenylacetamide	103-84-4	30/07/88	7E	0	0	4	4	2	*	*	*	*	*	*	*	*	*	*	*	*	8	0L
pine oil (mixture)	8002-09-3	20/06/88	*	*	*	6	6	2		2	*	*	*	*	*	*	*	*	*	*	*	*
potassium ethyl xanthate	140-89-6	20/06/88	*	*	*	6	6	2			*	*	*	*	*	*	8Q	*	8Q	*	8L	*
potassium hexyl xanthate	2720-76-5	20/06/88	*	*	*	6	6				*	*	*	*	*	*	*	*	*	*	*	*
quinoline	91-22-5	20/06/88	7E	0	0	4	4	4	*	2	0	*	0	2L	2L	2L	6Q	6Q	*	6W	10	10
8-quinolinol	148-24-3	30/07/88	0E	4E	4L	4Q	4Q	4Q	*	*	0E	0E	*	4Q	4Q	*	6Q	6Q	*	*	10W	0
sodium butyl xanthate	141-33-3	20/06/88	*	*	*	*	*	*	*	*	4	4	*	6L	6L	*	*	*	*	*	*	*
sodium dimethyldithiocarbamate	128-04-1	31/08/88	*	0L	*	8	8	2	*	*	8L	8L	*	6L	6L	*	*	*	*	2W	4Q	*
sodium ethyl xanthate	140-90-9	20/06/88	*	*	*	6	6	*	*	*	*	*	*	2L	2L	*	*	*	*	*	*	*
strontium	7440-24-6	20/06/88	10E	10E	*	2Q		2Q			*	*	*	*	*	*	0	0	*	*	8L	*
tannic acid (mixture)	1401-55-4	20/06/88	*	*	*	4	4	2			2	*	2	*	*	*	4Q	4Q	*	0L	8L	10
1,1,1,2-tetrachloroethane	630-20-6	30/05/88	4E	*	4E	4	4	2	2	0	0	0	*	*	*	*	2Q	*	2Q	0Q	0	8W
tetraethylthiuram disulphide	97-77-8	30/07/88	10E	4E	4L	4	*	4	*	*	*	*	*	*	*	*	4Q	4Q	*	2	10	10Q
tetrahydrofuran	109-99-9	30/05/88	7E	0	0L	2	0	2	0	*	0L	0L	*	0L	0L	*	0Q	*	0Q	*	8W	*

TABLE 4

1988 EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL) UPDATE :

CHEMICALS PROMOTED TO THE EMPPL

Date: 06/03/89

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	ASSESSMENT DATE	Environ-Fate: TRANS	PERS	BIOA	TOXICITY: Acute: SUMM	AQUA	ORAL	INHL	DERM	Sub-lethal: Non-Mam: SUMM	AQUA	TERR	Plant: SUMM	AQUA	TERR	Mammalian: SUMM	ORAL	INHL	TERR	GENE	CARC
1,2,3,4-tetrahydronaphthalene (Tetralin)	119-64-2	30/05/88	10E	4E	7Q	4Q	4Q	2	*	0	2E	2E	*	*	*	*	*	*	*	*	0L	*
tetramethylthiuram disulphide	137-26-8	30/07/88	*	4	4E	10	10	4	4	0Q	*	*	*	6Q	6Q	*	6	6	*	6	10	10Q
thiophene	110-02-1	30/07/88	7E	7Q	0L	6Q	6Q	4	2	*	*	*	*	0	0	*	10Q	*	10Q	*	0L	*
2,4-toluene diisocyanate	584-84-9	30/07/88	0E	4E	0E	6	6L	4	6	*	*	*	*	*	*	*	10		10	*	10Q	10Q
2,6-toluene diisocyanate (2,6-TDI)	91-08-7	31/08/88	0E	4E	0E	6	2	*	6	0	*	*	*	*	*	*	*	*	*	*	2L	10W
toluene diisocyanate-mixture (TDI)	26471-62-5	31/08/88	*	0	0L	6	2W	2	6	0	*	*	*	*	*	*	10L	*	10L	*	10W	10
1,1,1-trichloroethane	71-55-6	30/05/88	0E	10	0	4	4	2	0	0	2W	2W	*	0	0	*	2W	0	2W	0	10W	10Q
1,2,4-trimethylbenzene	95-63-6	30/05/88	10E	4E	4	6	6	0	6	*	0E	0E	*	*	*	*	*	*	*	*	*	*
trixylyl phosphate	25155-23-1	20/06/88	*	*	7L	8W	8W	0			0L	0L	*	4W	4W	*	*	*	*	*	0L	*
uranium	7440-61-1	20/06/88	10E	10E	7W	6	6	6			*	*	*	4	4L	4	10	10	10	*	*	*
vanillic acid	121-34-6	20/06/88	*	0	0E	4	4	4E	*	*	0E	0E	*	0L	*	0L	*	*	*	*	8L	*
zinc diethyldithiocarbamate	14324-55-1	30/07/88	*	*	*	2	*	2	*	*	*	*	*	*	*	*	8Q	8Q	*	0L	2L	10L

TABLE 5

1988 EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL) UPDATE

EXPOSURE POTENTIAL AND REFERENCES FOR CHEMICALS PROMOTED TO THE EMPPL

USE OF TABLE 5
For each chemical listed under the CHEMICAL NAME column: 1. The letter in the USE REL. (use/release) column corresponds to the chemical's exposure classification as per the criteria given in Table 2; 2. A number under any of the four SECTOR columns indicates that the chemical has been identified in effluent from that Sector, or is used or manufactured by that Sector. The numbers themselves indicate the source of effluent or use/manufacture data used to identify the chemical and Sector, and correspond to the reference numbers in the Bibliography; 3. The letter in the LAB CAP (laboratory capability) column indicates if a routine analytical protocol and minimum detection limit for the chemical are currently available at the MOE laboratory (Y=yes, N=no)

TABLE 5
1988 EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL) UPDATE:
EXPOSURE POTENTIAL AND REFERENCES FOR CHEMICALS PROMOTED TO THE EMPPL

Date:06/03/89

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	LAB CAP	USE REL.	PULP AND PAPER SECTOR	ORGANIC CHEMICAL SECTOR	IRON AND STEEL SECTOR	MINING SECTOR	ELECTRIC POWER SECTOR
acrylamide	79-06-1	N	B		58			
benz[a]acridine	225-11-6	N	B			76		
1H-benzimidazole	51-17-2	N	B			76		
benzo[b]thiophene	95-15-8	N	B			75,76		
benzo[h]quinoline	230-27-3	N	B			76		
borneol	507-70-0	N	B	77				
boron	7440-42-8	Y	B		62,67,68,80,86			88,89,90,91,92,93,94,95,96,97
1-bromo-2-chloroethane	107-04-0	N	B		59			
bromodichloromethane	75-27-4	Y	B		60			
p-bromophenol	106-41-2	N	B		84			
2-butenoic acid	3724-65-0	N	B		62			
2-(2-butoxyethoxy)ethanol	112-34-5	N	B	77	61			
N-t-butyl-2-benzothiazolesulphenamide	95-31-8	N	B		63			
n-butylamine	109-73-9	N	B		63			
9H-carbazole	86-74-8	N	B			76		
carbon disulfide	75-15-0	N	B		64			
cineole	470-82-6	N	B	77				
cyclohexanol	108-93-0	N	B		65			
cyclohexanone	108-94-1	N	B		65			
N-cyclohexyl-2-benzothiazolesulphenamide	95-33-0	N	B		63			
cyclohexylamine	108-91-8	N	B		63			
di-n-octyl phthalate	117-84-0	Y	B		43,59,61,66,67,70,81,82,86			

TABLE 5
1988 EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL) UPDATE:
EXPOSURE POTENTIAL AND REFERENCES FOR CHEMICALS PROMOTED TO THE EMPPL

Date:06/03/89

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	LAB CAP	USE REL.	PULP AND PAPER SECTOR	ORGANIC CHEMICAL SECTOR	IRON AND STEEL SECTOR	MINING SECTOR	ELECTRIC POWER SECTOR
4,4'-di-n-octyldiphenylamine	101-67-7	N	B		63			
1,4-dichlorobut-2-ene	764-41-0	N	B		84			
1,2-dichlorobut-3-ene	760-23-6	N	B		84			
dichlorobutene (mixture)	11069-19-5	N	B		84			
4,5-dichloroguaiacol	2460-49-3	Y	B	77				
diethyl phthalate (DEP)	84-66-2	N	B		42,59,60,64,83,87			
N,N-diethyl-m-toluamide (DEET)	134-62-3	N	B		63			
1,3-diethylbenzene (meta)	141-93-5	N	B		60			
1,2-diethylbenzene (ortho)	135-01-3	N	B		60			
5,6-dihydro-2-methyl-1,4-oxathiin-3-carboxanilide	5234-68-4	N	B		63			
5,6-dihydro-2-methyl-1,4-oxathiin-3-carboxanilide-4,4-dioxide	5259-88-1	N	B		63			
dimethyl sulphide	75-18-3	N	B	77	69			
2,5-dimethylphenol	95-87-4	N	B			76		
2,6-dimethylphenol	576-26-1	N	B			76		
3,4-dimethylphenol	95-65-8	N	B			76		
3,5-dimethylphenol	108-68-9	N	B			76		
dimethylphenol (isomer nonspecific)	1300-71-6	N	B		66	76		
diphenyl 4,4'-methylenedicarbanilate	101-65-5	N	B		63			
diphenylmethane 4,4'-diisocyanate (MDI)	101-68-8	N	B		63			
ethanol	64-17-5	N	B		85			
ethylbenzene	100-41-4	Y	B		60			
furfural	98-01-1	N	B	77				

TABLE 5
1988 EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL) UPDATE:
EXPOSURE POTENTIAL AND REFERENCES FOR CHEMICALS PROMOTED TO THE EMPPL

Date:06/03/89

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	LAB CAP	USE REL.	PULP AND PAPER SECTOR	ORGANIC CHEMICAL SECTOR	IRON AND STEEL SECTOR	MINING SECTOR	ELECTRIC POWER SECTOR
guaiacol	90-05-1	N	B	77				
1,2,3,4,5,6-hexachlorocyclohexane (gamma isomer) (Lindane)	58-89-9	N	B		67			
hydrogen sulfide	7783-06-4	N	B	77				96
2-hydroxy-3-methyl-2-cyclopenten-1-one	80-71-7	N	B	77				
lithium	7439-93-2	Y	B					89,90,91,95,96
2-mercaptobenzothiazole disulphide	120-78-5	N	B		63			
2-mercaptoethanol	60-24-2	N	B		63			
methyl methacrylate	80-62-6	N	B		62			
2-methylpyridine	109-06-8	N	B			76		
m-methylstyrene	100-80-1	N	B		68	76		
p-methylstyrene	622-97-9	N	B		68	76		
morpholine	110-91-8	N	B		63			88,89,90,92,93,94,96
N-morpholinyl-2-benzothiazolesulphenamide	102-77-2	N	B		63			
1-naphthalenol	90-15-3	N	B			76		
nitrobenzene	98-95-3	N	B		83			
2-nitrophenol	88-75-5	N	B		86			
4-nitrosomorpholine	59-89-2	N	B		67,86			
N-phenylacetamide	103-84-4	N	B			76		
pine oil (mixture)	8002-09-3	N	B				78	
potassium ethyl xanthate	140-89-6	N	B				78	
potassium hexyl xanthate	2720-76-5	N	B				78	
quinoline	91-22-5	N	B		70	76		

TABLE 5
1988 EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL) UPDATE:
EXPOSURE POTENTIAL AND REFERENCES FOR CHEMICALS PROMOTED TO THE EMPPL

Date:06/03/89

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	LAB CAP	USE REL.	PULP AND PAPER SECTOR	ORGANIC CHEMICAL SECTOR	IRON AND STEEL SECTOR	MINING SECTOR	ELECTRIC POWER SECTOR
8-quinolinol	148-24-3	N	B			76		
sodium butyl xanthate	141-33-3	N	B				78	
sodium dimethyldithiocarbamate	128-04-1	N	B		63			
sodium ethyl xanthate	140-90-9	N	B				78	
strontium	7440-24-6	Y	B					88,89,90,91,92,93,94,95,96,97
tannic acid (mixture)	1401-55-4	N	B				78	
1,1,1,2-tetrachloroethane	630-20-6	N	B		71			
tetraethylthiuram disulphide	97-77-8	N	B		63			
tetrahydrofuran	109-99-9	N	B		72			
1,2,3,4-tetrahydronaphthalene (Tetralin)	119-64-2	N	B		73			
tetramethylthiuram disulphide	137-26-8	N	B		63			
thiophene	110-02-1	N	B			76		
2,4-toluene diisocyanate	584-84-9	N	B		63			
2,6-toluene diisocyanate (2,6-TDI)	91-08-7	N	B		63			
toluene diisocyanate-mixture (TDI)	26471-62-5	N	B		63			
1,1,1-trichloroethane	71-55-6	N	B	77	74			
1,2,4-trimethylbenzene	95-63-6	N	B		60			
trixylyl phosphate	25155-23-1	N	B					95,96
uranium	7440-61-1	Y	B				78	
vanillic acid	121-34-6	N	B	77				
zinc diethyldithiocarbamate	14324-55-1	N	B		63			

TABLE 6

1988 EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL) UPDATE

CHEMICALS WHICH MAY BE PROMOTED TO THE EMPPL BASED ON QSAR ESTIMATES OF AQUATIC TOXICITY ONLY

KEY TO ABBREVIATIONS USED IN TABLE 6
AQUATIC: aquatic biota
BIOAC: bioaccumulation
CARCIN: carcinogenicity
DERMAL: terrestrial biota, dermal exposure route
ENVIRON FATE: environmental fate
GEN-MUT: genotoxicity/mutagenicity
INHAL: terrestrial biota, inhalational exposure route
NON-MAM: non-mammalian species
ORAL: terrestrial biota, oral exposure route
PERSIST: environmental persistence
SUMMARY: final score assigned to parameter
TERAT: teratogenicity
TERREST: terrestrial species
TRANS: environmental transport (partitioning)

TABLE 6

1988 EFFLUENT MONITORING PRIORITY POLLUTANTS LIST (EMPPL) UPDATE -

CHEMICALS WHICH MAY BE PROMOTED TO THE EMPPL DUE ONLY TO QSAR ESTIMATES OF AQUATIC TOXICITY

Date: 06/03/89

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	ASSESSMENT DATE	TOXICITY: Environ-Fate: Persistence	Environ-Fate: Bioaccumulation	Environ-Fate: Transport	Acute: Saltwater Mammalian	Acute: Freshwater Mammalian	Acute: Other	Acute: Human	Acute: Daphnid	Sub-lethal: Non-Mam Saltwater Mammalian	Sub-lethal: Non-Mam Aquatic Mammalian	Sub-lethal: Non-Mam Terrestrial Mammalian	Sub-lethal: Plant Saltwater Mammalian	Sub-lethal: Plant Aquatic Mammalian	Sub-lethal: Plant Terrestrial Mammalian	Mammalian Saltwater Mammalian	Mammalian Other	Mammalian Human	Mammalian Terrestrial Mammalian	Genetic - Mammalian	Carcinogenic
1,4-diethylbenzene (para)	105-05-5	31/08/88	4E	*	7E	6E	6E	*	*	*	2E	2E	*	*	*	*	4Q	*	4Q	*	*	*
2,3-dimethylphenol	526-75-0	30/07/88	7E	0L	4E	6E	6E	4W	*	*	2L	2L	*	*	*	*	*	*	*	*	0	*
3-ethyltoluene	620-14-4	31/08/88	0E	0Q	4L	6E	6E	*	*	*	0E	0E	*	*	*	*	*	*	*	*	*	*
fenchone	1195-79-5	20/06/88	10E	7Q	4E	6E	6E	0	*	*	0E	0E	*	*	*	*	*	*	*	*	*	*
homovanillic acid	306-08-1	20/06/88	10E	4E	0E	6E	6E	*	*	*	0E	0E	*	*	*	*	*	*	*	*	0L	*
methyl crotonate	623-43-8	30/05/88	10E	4E	0E	6E	6E	2	*	0	0E	0E	*	*	*	*	*	*	*	*	*	*
2,2'-methylenebis(4-methyl-6-nonylphenol)	7786-17-6	31/08/88	*	4E	10E	10E	10E	0	*	*	6E	6E	*	*	*	*	*	*	*	*	*	*

5 Bibliography

58. "Pre-regulation data submission document Appendix 1, October 6, 1986". [Submitted by Borg-Warner (Canada) Limited to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

59. King, L., 1988. "Upper Great Lakes connecting channels study: Geographic area report, St. Clair River Canadian point sources". Environment Canada, Toronto [unpublished].

60. Ontario Research Foundation, 1987, "Pre-regulation data submission document, May 29, 1987". [Submitted by Polysar Limited to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

61. "Ontario Ministry of the Environment open scan: Canadian Oxy Chemicals Limited, May 5, 1987". [Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

62. "Ontario Ministry of the Environment open scan: Rohm and Haas Canada Inc., Sept. 12, 1988". [Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

63. "Pre-regulation data submission document, May 21, 1987". [Submitted by Uniroyal Chemical Limited to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

64. Ecoresearch, 1987. "Pre-regulation analytical characterization report, August 1987". [Submitted by Courtaulds Fibres Inc. to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

65. "Pre-regulation data submission document, October 14, 1986". [Submitted by DuPont Canada Inc. to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

* Note: this is a continuation of the bibliography contained in the 1987 EMPPL Report (Ref. 79).

66. Mann Testing Laboratories Limited, 1986. "Pre-regulation analytical characterization report, March 21, 1986". [Submitted by Dow Chemical Canada Inc. to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

67. "Ontario Ministry of the Environment open scan: Uniroyal Chemical Ltd., July 16, 1987". [Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

68. "Ontario Ministry of the Environment open scan: Dupont Canada Inc., May 25, 1987". [Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

69. "Ontario Ministry of the Environment open scan: B.F. Goodrich Canada Inc., June 23, 1987". [Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

70. "Ontario Ministry of the Environment open scan: Ethyl Canada Inc., April 29, 1987." [Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

71. "Pre-regulation data submission document September 12, 1986". [Submitted by Dow Chemical Canada Inc. to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

72. Mann Testing Laboratories Limited, 1988. "Pre-regulation data submission report, February 22, 1988". [Submitted by Courtaulds Fiber Inc. to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

73. "Pre-regulation data submission document, March 27, 1987". [Submitted by BTL Industries Inc., to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

74. "Pre-regulation data submission: Dow monthly analysis report, April, 1987". [Submitted by Dow Chemical Canada Inc. to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (Unpublished)].

75. "Ontario Ministry of the Environment open scan: February, 1988". [Ontario Ministry of the Environment, MISA Office, Industrial Sector, Iron and steel, Toronto (Unpublished)].

76. ASL Analytical Service Laboratories Limited and Dearborn Environmental Consulting, 1988. "Pre-regulation monitoring: chemical characterization of wastewater from Ontario Steel Mills". [Prepared for the Canadian Steel Environmental Association, Toronto, Ontario].

77. "Ontario Ministry of the Environment open scan: 1988". [Ontario Ministry of the Environment, MISA Office, Industrial Sector, Pulp and paper, Toronto (Unpublished)].

78. Hawley, J.R., 1977. The use, characteristics and toxicity of mine-mill reagents in the province of Ontario. Ontario Ministry of the Environment, Water Resources Branch, Toronto.

79. Ontario Ministry of the Environment, 1988. The effluent monitoring priority pollutant list (1987). Ministry of the Environment, Hazardous Contaminants Coordination Branch, Toronto.

80. "Ontario Ministry of the Environment open scan: Courtaulds Fibres Inc., April 26, 1987". [Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic Chemical manufacturing, Toronto (unpublished)].

81. "Ontario Ministry of the Environment open scan: Cornwall Chemicals, March 25, 1987". [Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic Chemical Manufacturing, Toronto (unpublished)].

82. Xenon Environmental Inc., 1987. "Pre-regulation data submission document, March 23, 1987". [Submitted by Novacor Chemicals Ltd. to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic Chemical Manufacturing, Toronto (unpublished)].

83. Ontario Research Foundation, 1987. "Pre-regulation data submission document, June, 1987". [Submitted by Ethyl Canada Inc. to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic Chemical Manufacturing, Toronto (unpublished).]

84. "Ontario Ministry of the Environment open scan: Dow Chemical Canada Inc., March 18, 1987. [Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic Chemical Manufacturing, Toronto (unpublished)].

85. Chin, F. 1982. "Industrial Effluent Survey, June 1982" Environment Canada, Environmental Protection Service, (unpublished).

86. "Ontario Ministry of the Environment open scan: Dupont Canada Inc., Maitland, February 26, 1987". [Ontario Ministry of the Environment, MISA Office, Industrial Sector, Organic chemical manufacturing, Toronto (unpublished)].

87. Ontario Ministry of the Environment, 1981 - 1987. "Niagara River Monitoring Information System Reports 1981-87". Ontario Ministry of the Environment, Hamilton Region, Niagara River Improvement Project, Intergovernmental Relations and Strategic Projects Division, Hamilton.

88. "Lambton Thermal Generating Station, MISA Pre-regulation Monitoring Program Results, July 1988". [Submitted by Ontario Hydro to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Electric Power Generation, Toronto (unpublished)].

89. "Lakeview Generating Station, MISA Pre-regulation Monitoring Program Results, June 30, 1988". [Submitted by Ontario Hydro to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Electric Power Generation, Toront (unpublished)].

90. "Nanticoke Thermal Generating Station, MISA Pre-regulation Monitoring Program Results, July 1988". [Submitted by Ontario Hydro to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Electric Power Generation, Toronto (unpublished)].

91. "Mothballed Fossil-Fired Thermal Generating Station, MISA Pre-regulation Monitoring Program Results, August 1988". [Submitted by Ontario Hydro to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Electrical Generation, Toronto (unpublished)].

92. "Lennox Thermal Generating Station, MISA Pre-regulation Monitoring Program Results, July 14, 1988". [Submitted by Ontario Hydro to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Electrical Power Generation, Toronto (unpublished)].

93. "Atikokan Thermal Generating Station, MISA Pre-regulation Monitoring Program Results, August 1988". [Submitted by Ontario Hydro to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Electric Power Generation, Toronto (unpublished)].

94. "Thunder Bay Generating Station, MISA Pre-regulation Monitoring Program Results". [Submitted by Ontario Hydro to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Electric Power Generation, Toronto (unpublished)].

95. "Ontario Hydro MISA Program, Darlington GS Construction and Communicationing Pre-Regulation Monitoring Program and Results, July 4, 1988". [Submitted by Ontario Hydro Environmental Studies & Assessments Department to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Electrical Power Generation, Toronto (unpublished)].

96. "Nuclear Generation Facilities MISA Program: Analytical Results of Pre-Regulation Monitoring Program, June 1988". [Submitted by Ontario Hydro Environmental Protection Section to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Electric Power Generation, Toronto (unpublished)].

97. "Nuclear Generation Facilities MISA Program: Characterization of Aqueous Effluents and Results of Pre-Regulation Monitoring Program for NPD Waste Management Facility, September 1988". [Submitted by Ontario Hydro Environmental Protection Section to the Ontario Ministry of the Environment, MISA Office, Industrial Sector, Electric Power Generation, Toronto (unpublished)].

Appendix A:
Guidelines for Using EMPPL Score Qualifiers and Criteria

I. General Description of Score Qualifiers

Insufficient Information for Scoring (*)

The insufficient data (*) tag is used where there are no data for a particular parameter or exposure route available, following a Level II (bibliographic database) search. Any individual oral, inhalational, dermal or aquatic score and tag fields are left blank if no information for them is available after a Level I (factual database and reference text) search.

Limited Data (L)

The limited data (L) tag is used when the data available is of limited scope.

Worst-Case Designation (W; formerly "!")

The worst-case tag (W) is used when a score is based on data obtained from a study reporting an unusual endpoint or using a route of administration which would overestimate the hazard.

(W)-tagged scores may decrease when additional data becomes available during a subsequent detailed assessment.

Questionable Data (Q; formerly "?")

The questionable-data tag (Q) is used to indicate that the data used does not fully match the criteria description, was obtained from situations of questionable relevance to the Ontario environment, or is otherwise questionable due to deficiencies in study or analytical methodology.

(Q)-tagged scores may increase or decrease when additional data becomes available during a subsequent detailed assessment.

Estimated Data (E)

The estimated data tag (E) is used when a value is derived from a model such as a QSAR or fugacity model. In most cases this type of data is acceptable only if "real" data is absent. An exception is in scoring persistence (see section II, below).

Hierarchy of Tags

Only a single tag is to be assigned to a score. The order of precedence is: Q = W > E > L. For example, if a score is based on estimated data and also warrarts a (W) tag, the tag assigned would be (W).

II. Persistence Criteria

Types of Data Preferred

Biodegradation data best reflecting the conditions in the ambient environment is preferable over data derived from studies using media such as activated sludge. The order of preference is:

environmental data (e.g. river die-away, half-life in soils) > some shaker flask studies > QSAR estimates > BOD.

When QSAR results in the form "$t_{1/2} > x$" are used for scoring, the score is assigned as if $t_{1/2}=2x$.

If data from the studies mentioned above are available, scoring is not based on other types of studies even if they represent a worst-case. If preferred data is not available, the obtainable data is used and a (Q) tag is assigned.

Limited Database

When data on persistence are available for one medium only, an (L) tag is assigned.

III. Bioaccumulation Criteria

Use of Log P in the Absence of BCF Data

When log P values are used in the absence of bioaccumulation factors (BCFs) for scoring bioaccumulation, an (L) tag is assigned.

Use of BCFs for Unusual Species

When bioaccumulation is scored on the basis of a BCF for an unusual species, e.g. an aquatic organism other than a freshwater fish, a (Q) tag is assigned.

IV. Acute Lethality Criteria

Route of Administration (Terrestrial Species)

When acute lethality is being scored, the score is based on intravenous, subcutaneous or intraperitoneal route data only if oral, dermal or inhalational route data are not available. A (W) tag is assigned in these cases, and scores are determined by using the oral LD_{50} criteria.

Aquatic Toxicity Ratings

When an overall acute lethality score is based only on an "aquatic toxicity rating" range, an (L) tag is assigned.

Saltwater Studies

Freshwater species studies are preferred over saltwater studies. If an aquatic LC_{50} score must be based on a saltwater study (i.e. no freshwater data exist), a (Q) tag is assigned.

Scoring Acute Lethality in the Absence of LD_{50}/LC_{50}s

When only LD_{Lo} or LC_{Lo} data are available, the data are scored as if they were for LD/LC_{50}s and a (W) tag is assigned.

When only LD_{100} or LC_{100} data are available, the data are scored as if they were for LD/LC_{50}s and a (Q) tag is assigned.

V. Sublethal Effects Criteria

Route of Administration (Mammalian Studies)

When sublethal effects are being scored, the score is based on intravenous, subcutaneous and intraperitoneal route data only if oral, dermal or inhalational route data are not available. A (W) tag is assigned in these cases, and scores are determined using the oral exposure criteria.

Duration of Study (Mammalian Studies)

The criteria are based on data from exposures of 90 days or more in duration. If such data is lacking, the results of shorter-term studies are used, tagged as questionable data (Q), and scored based on a modification of the data as described below. The rationale for this is that over a shorter period of time, higher concentrations of a toxin may be tolerated by an organism than over a extended period. The order of preference is $\geq$90 days, 28-89 days, <28 days duration.

If data from studies of 28 to 89 days exposure duration are used, the data values are divided by 10. If data from studies of less than 28 days exposure duration are used, the data values are divided by 100.

Estimating NOAEL when only LOAELs are available (Mammalian Studies)

In cases where only LOAELs are available, or in cases where some studies give LOAEL figures lower than the NOAELs reported in other studies, scores are based on the lowest LOAEL divided by a safety factor of 10, and are tagged (Q).

Limited Database

When a sublethal effects score is based on only one piece of data or on data for only one species, an (L) tag is assigned.

VI. Genotoxicity / Mutagenicity Criteria

Absence of Eukaryotic or In Vivo *Data*

If positive prokaryotic in vitro (e.g. Ames salmonella) assays are available, but positive or negative eukaryotic or in vivo data are absent, a score of 4 is assigned, with a (Q) tag.

Limited Database

When the score is based on only one piece of data or on data for only one species strain, an (L) tag is assigned.

VII. Carcinogenicity Criteria

Limited Database

When the score is based on only one piece of data or on data for only one species strain, an (L) tag is assigned.

Appendix B:
Information Sources for Preliminary Assessments

Level I Search Sources (Printed Texts)
American Conference of Governmental Industrial Hygienists (ACGIH), 1986 - Documentation of Threshold Limit Values for Substances in Workroom Air
Center for Lake Superior Environmental Studies (CLSES), 1987 - Acute Toxicities of Organic Chemicals to Fathead Minnows
Clayton and Clayton, 1982. Patty's Industrial Hygiene and Toxicology
Hawley, 1981 - The Condensed Chemical Dictionary
Hayes, 1982 - Pesticides Studied in Man
International Agency for Research on Cancer (IARC), 1972 - IARC Monographs series
Mayer and Ellersieck, 1986 - Manual of Acute Toxicity
Michigan Dept. of Natural Resources - CESARS Chemical Profiles and CMR Hazard Assessment Profiles
Packer, 1975 - Nanogen Index
Sax, 1984 - Dangerous Properties of Industrial Materials
Shepard, 1986 - Catalog of Teratogenic Agents
Sittig, 1985 - Handbook of Toxic and Hazardous Chemicals and Carcinogens
Soderman, 1982 - CRC Handbook of Identified Carcinogens and Noncarcinogens: Carcinogenicity / Mutagenicity Database, Vol. 1
U.S. National Research Council, 1977-87 - Drinking Water and Health, Vols. 1-7
U.S. National Toxicology Program (NTP), 1980-86 - Bioassay for Possible Carcinogenicity
Verschueren, 1983 - Handbook of Environmental Data on Organic Chemicals
Windholz et al., 1983 - The Merck Index
Worthing, 1987 - The Pesticide Manual
Other reviews from recognized agencies

Level I Search Sources (Databases)
AQUIRE (aquatic toxicity and bioaccumulation)
BIODEG (environmental fate)
CA Registry (synonyms, old CAS numbers)
CCRIS (carcinogenicity)
CHEMFATE (chemical properties, bioaccumulation factors, environmental fate)
ENVIROFATE (environmental fate)
GENETOX (genotoxicity and mutagenicity)
HSDB (chemical properties, environmental fate, toxicity)
ISHOW (chemical properties)
LOGP (partition coefficients)
PHYTOTOX (phytotoxicity)
RTECS (toxicity)

Level II Search Sources (Databases)
CA Search (all fields)
NTIS (environmental fate)
QSAR (estimates of chemical properties, biodegradation, toxicity)
TOXLINE (acute and sublethal toxicity)

Appendix C:
Priority Substances Advisory Committee

I. Advisors

W. Berg, Laboratory Services Branch
C. De Barros, Water Resources Branch
K. Johnson, Hazardous Contaminants Coordination Branch
R. Khettry / G. Castonguay, Waste Management Branch
E. Leggatt, Hazardous Contaminants Coordination Branch
R. Macfarlane, Hazardous Contaminants Coordination Branch
H. Monteith, Water Resources Branch
J. Smith, Hazardous Contaminants Coordination Branch
D. Pascoe, Environment Canada
A. Socha, Hazardous Contaminants Coordination Branch
J. Stopps / E. McCloskey, Ministry of Labour
A. Szakolcai, Air Resources Branch
T. Tuszynski, Water Resources Branch
J. Vogt, West-Central Region

II. Terms of Reference

The Committee shall:

1. Provide direction to the Hazardous Contaminants Coordination Branch in its development of criteria and methodologies for chemical identification and hazard assessment which are required for the listing/delisting of chemicals for the Effluent Monitoring Priority Pollutants List (EMPPL) and other lists that may be established and for the selection of candidate chemicals for multimedia standard setting;

2. Provide direction in ensuring that the data and information compilation and subsequent assessment of chemicals are of high quality and take into account the pertinent available information;

3. Identify any critical data gaps that may preclude the assessment of chemicals and make recommendations for obtaining the necessary information;

4. Provide an annual listing of the EMPPL and candidate chemicals for multimedia standard setting; and

5. Recommend chemicals or groups of chemicals for inclusion in the identification and assessment process.

Appendix D

Chemicals Not Promoted to the EMPPL

KEY TO ABBREVIATIONS USED IN APPENDIX D
AQUATIC: aquatic biota
BIOAC: bioaccumulation
CARCIN: carcinogenicity
DERMAL: terrestrial biota, dermal exposure route
ENVIRON FATE: environmental fate
GEN-MUT: genotoxicity/mutagenicity
INHAL: terrestrial biota, inhalational exposure route
NON-MAM: non-mammalian species
ORAL: terrestrial biota, oral exposure route
PERSIST: environmental persistence
SUMMARY: final score assigned to parameter
TERAT: teratogenicity
TERREST: terrestrial species
TRANS: environmental transport (partitioning)

APPENDIX D

1988 CHEMICALS NOT PROMOTED TO THE EMPPL

Date: 06/03/89

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	ASSESSMENT DATE	Environ-Fate: PERSISTENCE	Environ-Fate: BIOACCUMULATION	Environ-Fate: TERRESTRIAL	TOXICITY: Acute: SUBACUTE MAMMALIAN	TOXICITY: Acute: ACUTE MAMMALIAN	TOXICITY: Acute: INHALATION	TOXICITY: Acute: DERMAL	TOXICITY: Sub-lethal: Non-Mam: SUBACUTE AVIAN	TOXICITY: Sub-lethal: Non-Mam: ACUTE AVIAN	TOXICITY: Sub-lethal: Non-Mam: TERRESTRIAL INVERTEBRATE	TOXICITY: Sub-lethal: Plant: SUBACUTE AQUATIC	TOXICITY: Sub-lethal: Plant: ACUTE AQUATIC	TOXICITY: Sub-lethal: Plant: TERRESTRIAL	TOXICITY: Sub-lethal: Mammalian: SUBACUTE MAMMALIAN	TOXICITY: Sub-lethal: Mammalian: ORAL	TOXICITY: Sub-lethal: Mammalian: INHALATION	TOXICITY: Sub-lethal: Mammalian: TERATOGENIC	TOXICITY: Sub-lethal: Mammalian: GENETIC - MUTAGENIC	TOXICITY: Sub-lethal: Mammalian: CARCINOGENIC
acetosyringone	2478-38-8	20/06/88	*	*	*	2W	*	2W	*	*	*	*	*	*	*	*	*	*	*	*	0L	*
benzofuran	271-89-6	30/07/88	7E	4E	4L	4	4	4W	*	*	2L	2L	*	*	*	*	*	*	*	*	2L	*
benzonitrile	100-47-0	30/07/88	4E	4E	0L	4	4	2	2	2	0	0	*	2	2	0L	*	*	*	*	0L	*
benzothiazole	95-16-9	30/05/88	*	4E	4L	4	*	4	*	*	*	*	*	0L	*	0L	*	*	*	*	2L	*
4,4'-bis(alpha,alpha-dimethylbenzyl)diphenylamine	10081-67-1	31/08/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
m-bromophenol	591-20-8	31/08/88	0E	10E	4L	4E	4E	*	*	*	0E	0E	*	2	2	*	*	*	*	*	*	*
o-bromophenol	95-56-7	31/08/88	10E	10E	4L	4	4	2	*	*	0E	0E	*	2L	2L	*	*	*	*	*	*	*
3-butenoic acid	625-38-7	30/05/88	0E	4E	0E	2E	2E	*	*	*	0E	0E	*	0Q	0Q	*	*	*	*	*	*	*
2-(2-butoxyethoxy)ethanol acetate	124-17-4	20/06/88	0E	4E	4E	2	2E	2		0	0E	0E	*	*	*	*	*	*		*	*	*
2-[2-(2-butoxyethoxy)ethoxy]ethanol	143-22-6	20/06/88	0E	4E	0E	2	0E	0		2	0E	0E		*	*	*	*	*	*	*	*	*
t-butyl alcohol	75-65-0	31/08/88	7E	10	0L	2	0	2	0	*	0E	0E	*	*	*	*	*	*	*	0	0	0L
N-sec-butyl-N-nitrosobutylamine	28023-81-6	31/08/88	4E	4E	4E	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
camphor	76-22-2	20/06/88	4E	0L	4E	2	2	2	*	*	0	0E	*	4	*	4	*	*	*	*	0	
3-carene	13466-78-9	20/06/88	*	*	*	2	*	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*
carene (isomer nonspecific)	74806-04-5	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
chloroethane	75-00-3	30/05/88	0	10E	0L	0	0L	*	0	*	0E	0E	*	*	*	*		*	4Q	*	2L	*
o-cresyl phosphate	18351-85-4	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
m-cresyl phosphate	22987-28-6	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
p-cresyl phosphate	6729-45-9	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
bis(2-cyanoethyl) sulphide	111-97-7	30/07/88	*	0E	0E	2	*	2	*	2	*	*	*	*	*	*	*	*	*	*	*	*
diethyl sulphide	352-93-2	31/08/88	7E	*	0L	0	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*
diethylamine	109-89-7	30/07/88	7E	0L	0L	4	4	2	2	2	0L	0L	*	2L	2L	*	4	*	4	*	2L	*
2,3-dihydro-1,4-benzodioxin	493-09-4	20/06/88	7E	4E	0E	2E	2E	*	*	*	0	0	*	*	*	*	*	*	*	*	*	*
2,3-dihydrobenzofuran	496-16-2	30/07/88	7E	4E	4L	4	4	*	*	*	0L	0L	*	*	*	*	*	*	*	*	*	*
dimethoxyphenol (isomer nonspecific)	25155-26-4	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0L	*

APPENDIX D

1988 CHEMICALS NOT PROMOTED TO THE EMPPL

Date: 06/03/89

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	ASSESSMENT DATE	Environ-Fate: Persistence	Environ-Fate: Bioaccumulation	Environ-Fate: Terrestrial	Toxicity: Acute: Aquatic Invertebrate	Toxicity: Acute: Aquatic Vertebrate	Toxicity: Acute: Other	Toxicity: Acute: Inhalation	Toxicity: Acute: Dermal	Toxicity: Sub-lethal: Non-Mammalian: Aquatic Invertebrate	Toxicity: Sub-lethal: Non-Mammalian: Aquatic Vertebrate	Toxicity: Sub-lethal: Non-Mammalian: Terrestrial	Toxicity: Sub-lethal: Plant: Aquatic	Toxicity: Sub-lethal: Plant: Algae	Toxicity: Sub-lethal: Plant: Terrestrial	Toxicity: Sub-lethal: Mammalian: Aquatic	Toxicity: Sub-lethal: Mammalian: Other	Toxicity: Sub-lethal: Mammalian: Inhalation	Toxicity: Sub-lethal: Mammalian: Terrestrial	Toxicity: Sub-lethal: Mammalian: Genetic	Toxicity: Sub-lethal: Mammalian: Acute
2,6-dimethoxyphenol	91-10-1	20/06/88	*	*	*	2	*	2	*	*	*	*	*	*	*	*	*	*	*	*	OL	*
dimethyl acridan (isomer nonspecific)	33478-89-6	30/07/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
2,6-dimethylpyridine	108-48-5	30/07/88	7E	7Q	4E	4	*	4	*	2	0	0	*	*	*	*	*	*	*	*	2L	*
ethenylbenzaldehyde (isomer nonspecific)	43145-54-6	30/07/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
1-ethynyl-4-methylbenzene	766-97-2	30/07/88	0E	0E	4E	4W	4E	4W	*	*	0E	0E	*	*	*	*	*	*	*	*	*	*
2-fenchol (isomer nonspecific)	1623-73-1	20/06/88	10E	7Q	4E	4E	4E	*	*	*	0E	0E	*	*	*	*	*	*	*	*	*	*
alpha-fenchyl alcohol (stereo isomer nonspecific)	14575-74-7	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
beta-fenchyl alcohol (stereo isomer nonspecific)	22627-95-8	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
(-)-beta-fenchyl alcohol	470-08-6	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
1-alpha-fenchyl alcohol	512-13-0	20/06/88	4E	7Q	4E	4E	4E	*	*	*	0E	0E	*	*	*	*	*	*	*	*	*	*
1-beta-fenchyl alcohol (stereo isomer nonspecific)	54783-67-4	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
longi-betafenchyl alcohol	68421-41-0	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
1-hexanal	66-25-1	20/06/88	10E	*	0L	4	4	2	0Q		*	*	*	*	*			*	*	*	*	*
2-hydroxycyclohexanone	533-60-8	20/06/88	0E	4E	0E	0E	0E	*	*	*	0E	0E	*	*	*	*	*	*	*	*	*	*
isoborneol	124-76-5	20/06/88	10E	7Q	4E	4E	4E	2	*	*	0E	0E	*	*	*	*	*	*	*	*	*	*
O-isopropyl ethylthionocarbamate	141-98-0	20/06/88	10E	4E	4E	4	4	2			0E	0E	*	*	*	*	*	*	*	*	*	*
1-(4-methoxyphenyl)ethanone	100-06-1	30/07/88	7E	4E	0L	2	2E	2	*	*	0E	0E	*	*	*	*	*	*	*	*	2Q	*
methyl isobutyl carbinol	105-30-6	20/06/88	7E	4E	0E	2	2E	2	*	2	0E	0E	*	*	*	*	*	*	*	*	*	*
4-methyl-2-pentanol	108-11-2	20/06/88	7E	0	0E	2	2	2	2W	2	0E	0E	*	*	*	*	*	*	*	*	*	*
4-methylbenzonitrile	104-85-8	30/07/88	0E	*	4E	4E	4E	2	*	0Q	0E	0E	*	*	*	*	*	*	*	*	*	*
methylcyclopentane	96-37-7	20/06/88	0E	4L	4L	0L	0L	*	0Q	*	*	*	*	2L	2L	*	*	*	*	*	*	*
methylenebis(4-cyclohexylisocyanate) (HMDI)	5124-30-1	30/07/88	4E	4E	4E	4	*	0	4	*	*	*	*	*	*	*	*	*	*	*	*	*
4-methylpyridine	108-89-4	30/07/88	7E	0L	0L	4	2	4	0Q	4	0Q	0Q	*	*	*	*	*	*	*	*	0L	*
3-methylpyridine	108-99-6	30/07/88	10E	4E	0L	4	4E	4		2	0E	0E		*	*	*	*	*	*	*	0L	*
1,6-naphthyridine	253-72-5	30/07/88	0E	10E	0E	4E	4E	*	*	*	0E	0E	*	*	*	*	*	*	*	*	*	*

APPENDIX D

1988 CHEMICALS NOT PROMOTED TO THE EMPPL

Date: 06/03/89

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	ASSESSMENT DATE	Environ-Fate: TRANSIENT	PERSISTENCE	BIOACCUMULATION	TOXICITY: Acute: SUMMARY	AQUATIC TOXICITY	ORAL LD50	INHALATION LC50	DERMAL LD50	Sub-lethal: Non-Mam: SUMMARY	AQUATIC TOXICITY	TERRESTRIAL TOXICITY	Plant: SUMMARY	AQUATIC TOXICITY	TERRESTRIAL TOXICITY	Mammalian: SUMMARY	ORAL LD50	INHALATION LC50	IRRITATION	TERATOGENICITY - EMBRYOTOXICITY	GENOTOXICITY	CARCINOGENICITY
3-phenylfuran	13679-41-9	30/07/88	10E	10E	0E	4E	4E	*	*	*	0E	0E	*	*	*	*	*	*	*	*	*	*	*
potassium amyl xanthate	2720-73-2	20/06/88	*	*	*	4	4	2			4Q	4Q	*	*	*	*	*	*	*	*	*	*	*
potassium isopropyl xanthate	140-92-1	20/06/88	*	*	*	4	4	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
sodium O,O-diethyl dithiophosphate	3338-24-7	20/06/88	*	*	*	2	2	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
sodium O,O-diisopropyl dithiophosphate	27205-99-8	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
sodium di-sec-butyl dithiophosphate (undefined structure)	52797-94-1	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
sodium diamyl dithiophosphate (undefined structure)	N/A	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
sodium diethyl dithiophosphate (undefined structure)	42016-03-5	20/06/88	*	*	*	2	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
sodium isobutyl xanthate	25306-75-6	20/06/88	*	*	*	4	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
sodium isopropyl xanthate	140-93-2	20/06/88	*	*	*	4	4	0W			*	*	*	*	*	*	*	*	*	*	*	*	*
syringaldehyde	134-96-3	20/06/88	7E	4E	0E	2E	2E	2W	*	*	0E	0E	*	*	*	*	*	*	*	*	2L	*	
tetrachlorodimethoxybenzene (isomer nonspecific)	N/A	20/06/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
m-toluoyl chloride	1711-06-4	30/07/88	0E	0E	4E	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
1,2,3-trimethylbenzene	526-73-8	30/05/88	4E	4E	4L	2	2	0	*	*	0E	0E	*	*	*	*	*	*	*	*	*	*	*
1,3,5-trimethylbenzene	108-67-8	30/05/88	0E	4	4L	4	4	*	0	*	0E	0E	*	2	2	*	*	*	*	*	*	*	*
tris(nonylphenyl)phosphite	26523-78-4	31/08/88	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*